



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/753,397	01/03/2001	Yushi Jinno	2933SE-62-DIV	2805
22442	7590	08/18/2004	EXAMINER	
SHERIDAN ROSS PC 1560 BROADWAY SUITE 1200 DENVER, CO 80202			ECKERT II, GEORGE C	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Period for Reply

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1) ☒ Responsive to communication(s) filed on 30 June 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

4) ☒ Claim(s) 1-12 is/are pending in the application.
4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 7-12 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 01 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☒ Certified copies of the priority documents have been received in Application No. 08/997,763.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

1) ☒ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 30, 2004 has been entered. Claims 1-12 are pending with claims 1-6 withdrawn as directed towards an invention non-elected without traverse (Paper No. 8).

Claim Objections

2. Objection to claim 7 is withdrawn based on applicant's amendment.

Claim Rejections - 35 USC § 112

3. The rejection of claims 7-12 under 112 first paragraph is withdrawn based on applicant's arguments and the inherent thermal conductivity of the materials.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,548,132 to Batra et al. in view of US 4,975,760 to Dohjo et al.

With regard to claims 7 and 8, Batra et al. teach, with reference to figures 4-7 and the text beginning in column 5, line 62, a bottom gate thin film transistor 50 comprising:

an insulator substrate 53,

a gate electrode 54 located on the insulator substrate,

an insulator film 56/58 provided on the substrate and gate electrode, and

an active layer 60 including a polycrystalline silicon film on the insulator film where a drain 70, a source 72 and a channel 62 over the gate electrode are defined, wherein grain sizes of the drain and source are greater than a grain size of the channel (see the description of the first embodiment of Batra (col. 2, lines 1-34) which teaches that the source/drain regions alone are made amorphous and annealed such that their grain size is larger than that of the channel. Note also that while Batra shows in figs. 4-7 only the drain offset 66 having a larger grain size, it is taught in column 6, lines 8-10 that the channel region alone may be masked such that the entire source and drain regions have the larger grain size, not merely the offset region).

With regard to claims 9 and 10, Batra et al. teach that the grain size of the channel is 0.1 μm (1000 Å) which is at least about 500 Å and will provide desired device characteristics such as on current. With regard to claims 11 and 12, Batra et al. did not expressly teach that the grain size of the channel were in a range of 1500 – 20,000 Å or 3000 – 10,000 Å. Because Batra et al. did teach that the grain size of the channel was approximately 1000 Å, it is considered obvious that one of skill in the art would form the channel region having grain sizes in the range of 3000 – 10,000 Å. The motivation for doing so, as is taught by Batra et al., is that larger grains will have fewer grain boundaries and fewer dangling Si bonds to trap carriers (col. 2, lines 39-41).

Regarding claims 7 and 8, Batra did not expressly teach that the gate electrode was formed of a refractory metal or that the gate has tapered end portions corresponding to the drain and source, that the gate has a higher thermal conductivity than the substrate or that the gate was operable to dissipate energy received at the polysilicon film adjacent the gate. Rather, Batra teaches that the gate electrode may be formed of polysilicon (col. 4, lines 54-58). Dohjo et al. teach, with reference to figure 3 and column 7, lines 22-25, that a gate electrode 17 of a thin film transistor may comprise a refractory metal (Mo-Ta alloy) having a taper. Batra et al. and Dohjo et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the device of Batra et al. using a refractory metal gate electrode with a taper rather than polysilicon. The motivation for doing so, as is taught by Dohjo et al., is that the use of a refractory metal in place of polysilicon reduces the resistivity of the gate (col. 2, lines 59-62) while a taper prevents a possible step damage on the gate electrode (col. 7, lines 28-32). That a refractory metal gate electrode has a higher thermal conductivity than the insulating substrate and that it is operable to dissipate energy are no more than inherent properties of a refractory gate over an oxide substrate. Therefore, it would have been obvious to combine Batra et al. and Dohjo et al. to obtain the invention of claims 7-12.

Response to Arguments


5. Applicant's arguments with respect to claims 7-12 have been considered but are moot in view of the new ground of rejection.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728. The examiner can normally be reached on 8:00 - 5:30, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


GEORGE ECKERT
PRIMARY EXAMINER